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AVIACIÓN CIVIL

Second interim statement IN-013/2011

Incident involving an Airbus A-320-211 aircraft, registration EC-GRH, operated by Vueling, on 20 April 2011 at the Seville Airport (Seville, Spain)

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MINISTERIO DE FOMENTO

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Important notice

This document constitutes the interim statement envisioned in Article 16.7 of Regulation (EU) no. 996/2010 of the European Parliament and of the Council, as well as in paragraph 6.6 of Annex 13 to the Convention on International Civil Aviation. The statement includes the details of the progress of the investigation and the most important operational safety issues revealed to date. The information provided herein is subject to change as the investigation proceeds

Pursuant to the contents of Regulation (EU) no. 96/2010 of the European Parliament and of the Council and of Annex 13 to the Convention on International Civil Aviation, the investigation is purely technical in nature and is not intended to determine or apportion blame or liability. The investigation is being conducted without necessarily resorting to evidentiary procedures and for the sole purpose of preventing future accidents.

Consequently, the use of this information for any purpose other than to prevent future accidents may result in faulty conclusions or interpretations.

Abbreviations

°	Degree
AC	Alternate Current
A/P	Auto Pilot
A/T	Auto Thrust
ATC	Air Traffic Control
ATPL (A)	Airline Transport Pilot License (Airplane)
BEA	France's accident investigation agency *(Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation civile)*
CPL (A)	Commercial Pilot License (Airplane)
ECAM	Electronic Centralized Aircraft Monitoring
FCOM	Flight Crew Operating Manual
FD	Flight Director
IDG	Integrated Drive Generator
ILS	Instruments Landing System
L/G	Landing Gear
METAR	Aviation routine weather report
MSN	Manufacture Serial Number
NWS	Nose Landing Gear Steering
PF	Pilot Flying
PFD	Primary Flight Display
PFR	Post Flight Report
PNF	Pilot Not Flying
RH	Right Hand
UIR	Upper Information Region
UTC	Coordinated Universal Time

DATA SUMMARY

LOCATION

Date and time	**Wednesday, 20 April 2011, at 20:50[1]**
Site	**Seville Airport - Seville - Spain**

AIRCRAFT

Registration	**EC-GRH**
Type and model	**AIRBUS A-320-211**
Operator	**VUELING**

Engines

Type and model	**CFM-56-5A1**
Number	**2**

CREW

	Pilot in command	Copilot	Copilot under instruction
Age	**47**	**33**	**42**
License	**ATPL (A)**	**ATPL (A)**	**CPL (A)**
Total flight hours	**10400**	**5700**	**870**
Flight hours on the type	**4100**	**3100**	**90**

INJURIES

	Fatal		Serious	Minor/None
Crew				**7**
Passengers				**150**
Third persons				

DAMAGE

Aircraft	**Minor**
Third parties	**None**

FLIGHT DATA

Operation	**Commercial air transport - Scheduled - Domestic passenger**
Phase of flight	**Landing**

REPORT

Date of approval	**28th February 2013**

[1] All times in this report are local. To obtain UTC, subtract two hours from local time.

On Wednesday, 20 April 2011, an A-320 Airbus, registration EC-GRH, operated by Vueling, took off at 19:02 from the Barcelona Airport on a scheduled flight to the Seville Airport. The aircraft's callsign was VY2220, and onboard were 150 passengers, 4 flight attendants and 3 flight crew (a captain and two copilots, one of them under instruction).

On this leg the captain was the pilot flying (PF), and he was also instructing the copilot under instruction, who was seated in the RH seat and acting as the pilot not flying (PNF). The qualified copilot was supervising the copilot under instruction.

Once at flight level 350, and after having crossed into the Madrid UIR, an amber caution (Master Caution) light was received in the cockpit at 19:29 accompanied by an ECAM (Electronic Centralized Aircraft Monitoring) ILS1 FAULT[2] message. Coincident with this, the captain's primary flight display (PFD1) went blank.

The crew stated that two or three seconds later, and without having taken any corrective actions, the warning cleared and PFD1 became operational, though a new warning, WHEEL NWS FAULT[3], appeared.

At that time, the captain instructed the qualified copilot to sit in the RH seat and relieve the copilot under instruction.

They held an approach briefing for runway 27 considering the possibility that a fault in the nose wheel steering system could impede the airplane's ability to taxi and clear the runway. The wind at the Seville Airport, according to the 20:00 (18:00 UTC) METAR, was from 220º at 11 knots.

At 20:08 the aircraft made initial contact with Seville approach and declared an urgency (PAN PAN PAN), informing of the possibility that they might block the runway. A Local Alert was then declared at the Seville Airport, and all other arrival and departure operations were suspended.

At 20:19, while on final approach, a second warning was received when the landing gear was lowered, just as the three green lights were displayed, indicating the gear was down and locked. This warning was the L/G SHOCK ABSORBER FAULT[4]. The crew also lost the autopilot (A/P), auto-thrust (A/T) and the flight director (FD). The navigational equipment remained operational. The captain took control of the aircraft in manual mode and was unable to regain any automatic functions.

The operator's Flight Crew Operations Manual (FCOM), in its section on abnormal and emergency procedures involving the landing gear, includes a procedure to be carried out

[2] ILS fault on CM1.
[3] Fault on the nose wheel steering system.
[4] Fault of the landing gear shock absorber.

whenever the WHEEL N.W. STEER FAULT[5] warning appears. This procedure includes a note stating that if the L/G SHOCK ABSORBER FAULT warning also appears, the nose wheels may be turned at a 90º angle from the airplane's longitudinal axis. As a result, the crew executed a low fly-over at 20:21 so that the control tower could verify the position of the landing gear. The controller confirmed that the nose wheels were turned to the right.

The crew requested to divert to the south so as not to fly over the city of Seville and to avoid storm clouds they had sighted to the north. ATC approved the maneuver.

At 20:29, the crew once more contacted Seville approach and declared an emergency (MAYDAY MAYDAY MAYDAY), inquiring about the possibility of using foam on the runway to lessen any potential damage. At 20:35, they were informed that this was not possible, since the airport did not have the type of foam necessary for such an emergency.

At 20:40, after conducting the relevant briefing and preparing the flight attendants and passengers, the crew initiated the maneuver to line up with the ILS on final and land. At 20:45, ATC cleared the crew to establish on ILS straight in approach runway 27.

At 20:48, the aircraft contacted the Seville Tower, which cleared it to land. The wind was from 240º at 10 knots.

The aircraft landed at 20:51. The aircraft stayed on the center line and decelerated normally, coming to a stop by rapid exit taxiway E3. The right nose wheel had blown out. The crew stated that the landing was normal, if somewhat noisy. There were no vibrations. They turned off the engines when the airplane stopped. After confirming with the tower and firefighters that there was no fire, the passengers were disembarked normally, a process that took place from 20:55 to 21:14.

At 22:10, the airplane was towed off the runway, which was declared operational at 22:15. The emergency was declared over at 22:18. The airport

[5] A318/A319/A320/A321 Vueling FCOM, Abnormal and Emergency, Landing Gear, Section 3.02.32, pg. 9.

closing affected a total of 29 flights. Eleven arriving flights were rerouted to the Jerez and Malaga airports. Of the 18 departing flights, 13 were delayed and five were canceled.

The flight crew members were properly qualified, experienced and physically fit. All had valid licenses, ratings and medical certificates.

The aircraft, serial number (MSN) 146, had valid airworthiness and registration certificates and had been maintained in accordance with the approved maintenance program.

Based on the instructions received from the airplane manufacturer, the alternating current supplies and steering system for the airplane's nose wheel landing gear were inspected and tested. During the inspection of the AC supply, evidence was found of arcing in one of the connectors in the bundle of cables that connects the AC no. 1 IDG (Integrated Drive Generator) and constant speed transmission fitted to the left engine to the airplane's electrical system.

As a result of this inspection, the no. 1 IDG and its associated electric harness were replaced, along with the nose wheel landing gear and its command and control elements, extension-retraction and steering components.

Following this maintenance and after the relevant tests were performed satisfactorily, the aircraft was returned to service on 1 May 2011.

In the two previous days leading up to the incident, the WHEEL NWS FAULT warning had been received on 18 April 2011 during a Barcelona-Venice flight and on 19 April 2011 on a Rome-Madrid flight. In both cases the corrective actions taken involved replacing components in the control and steering system for the nose wheel landing gear. Also, on 19 April 2011, the PFR (Post-Flight Report) mentioned multiple failures of the airplane's no. 1 electrical supply bus, resulting in the replacement of the control unit on the no. 1 generator.

Cooperating in the investigation have been France's accident investigation agency (BEA – Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation civile), the manufacturer (Airbus), the operator (Vueling) and the aircraft's maintenance organization (Iberia Mantenimiento).

The components removed from the aircraft as a result of the incident and in the two days prior were preserved for the investigation, and the inspections and tests to be performed and the information to be gathered were agreed upon. The purpose of these analyses has been to determine the origin and sequence of the events involved. As a consequence of such, evidences have been found that can justify the failure that originated this event but it hasn't been possible to establish conclusions about its origin.

Insofar as the characteristics of the incident are concerned, the aircraft manufacturer recorded 17 cases in which the landing took place with the nose wheel turned 90º on the A-320, corresponding to seven different failure modes. The investigation into this incident has determined that a different failure mode from those identified previously is involved.

From an operational aspect, investigators have analyzed the crew's actions from the time of the initial warning to the end of the flight, specifically in terms of the information available in the manufacturer's and operator's documentation onboard the aircraft. It should be noted that the manufacturer has provided information on seven similar events, dating back to the year 2000. In every one of these incidents, the crews kept their airplanes within the runway by utilizing typical piloting techniques.

The investigation is considered finished and the pertinent report is being redacted. Once the whole process established by the pertinent regulations is concluded, a final report will be issued.